

WHAT IS CLAIMED IS:

1. An image pickup apparatus, comprising:
a plurality of pixels which are two-
dimensionally arranged on a substrate, each of the
5 plurality of pixels comprising a set of a
semiconductor conversion element that converts an
incident electromagnetic wave into an electrical
signal and a switching element connected with the
semiconductor conversion element;
10 a drive wiring which is commonly connected with
the plurality of switching elements arranged in a
direction; and
a signal wiring which is commonly connected
with the plurality of switching elements arranged in
15 a direction different from the direction,
the switching element comprising a first
semiconductor layer, the semiconductor conversion
element being formed after the switching elements are
formed and comprising the second semiconductor layer
20 formed after the first semiconductor layer is formed,
wherein the semiconductor conversion element
has an electrode formed outside a region in which two
of the drive wiring, an electrode of the switching
element, and the signal wiring overlap each other,
25 exclusive of at least part of a region above the
drive wiring and at least part of a region above the
electrode of the switching element.

2. An image pickup apparatus according to claim
1, wherein the electrode of the semiconductor
conversion element is further formed so as not to be
formed in at least part of a region above the signal
5 wiring.

3. An image pickup apparatus according to claim
1, wherein a region where the electrode of the
semiconductor conversion element is not formed is
10 formed in the vicinity of the region where the two of
the drive wiring, the electrode of the switching
element, and the signal wiring overlap each other.

4. An image pickup apparatus according to claim
15 1, wherein the semiconductor conversion element has
an upper electrode and a lower electrode and one of
the upper electrode and the lower electrode is
connected to the switching element.

20 5. An image pickup apparatus according to claim
1, wherein the second semiconductor layer formed on a
region corresponding to the switching element is
thinner than the second semiconductor layer formed on
the electrode of the semiconductor conversion element.

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6. An image pickup apparatus according to claim
1, wherein the second semiconductor layer is not

formed on the region corresponding to the switching element.

7. An image pickup apparatus according to claim
5 1, wherein the switching element comprises a thin film transistor.

8. An image pickup apparatus according to claim
1, wherein the semiconductor conversion element is an
10 MIS type semiconductor conversion element comprising an insulating layer, a semiconductor layer, an ohmic contact layer, and electrode layers formed so as to sandwich the insulating layer, the semiconductor layer, and the ohmic contact layer.

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9. An image pickup apparatus according to claim
1, wherein the semiconductor conversion element is a
PIN type semiconductor conversion element comprising
an n-type semiconductor layer, an i-type
20 semiconductor layer, a p-type semiconductor layer, and electrode layers formed so as to sandwich the n-type semiconductor layer, the i-type semiconductor layer, and the p-type semiconductor layer.

25 10. An image pickup apparatus, comprising:
a plurality of pixels which are two-
dimensionally arranged on a substrate, each of the

plurality of pixels comprising a set of a
semiconductor conversion element that converts an
incident electromagnetic wave into an electrical
signal and a switching element connected with the
5 semiconductor conversion element;

a drive wiring which is commonly connected with
the plurality of switching elements arranged in a
direction; and

a signal wiring which is commonly connected
10 with the plurality of switching elements arranged in
a direction different from the direction,

the switching element comprising a first
semiconductor layer, the semiconductor conversion
element being formed above the switching element and
15 comprising a second semiconductor layer different
from the first semiconductor layer,

wherein the semiconductor conversion element
has an opening formed outside a region in which two
of the drive wiring, an electrode of the switching
20 element, and the signal wiring overlap each other and
in at least part of a region above the drive wiring
and at least part of a region above the electrode of
the switching element.

25 11. An image pickup apparatus according to
claim 10, wherein the opening is formed in the
vicinity of the region where the two of the drive

wiring, the electrode of the switching element, and the signal wirings overlap each other.

12. An image pickup apparatus according to
5 claim 10, wherein the opening is further formed in at least part of a region above the signal wiring.

13. An image pickup apparatus, comprising:
a plurality of pixels which are two-
10 dimensionally arranged on a substrate, each of the plurality of pixels comprising a set of a semiconductor conversion element that converts an incident electromagnetic wave into an electrical signal and a switching element connected with the
15 semiconductor conversion element;
a drive wiring which is commonly connected with the plurality of switching elements arranged in a direction; and
a signal wiring which is commonly connected
20 with the plurality of switching elements arranged in a direction different from the direction,
the switching element comprising a first semiconductor layer, the semiconductor conversion element being formed above the switching element and
25 comprising a second semiconductor layer different from the first semiconductor layer,
wherein the electrode of the semiconductor

conversion element is removed at least in vicinities of the region where the switching element is formed and in part of the drive wiring.

5 14. A radiation image pickup apparatus comprising the image pickup apparatus according to any one of claims 1 to 13, wherein:

 the semiconductor conversion element of the image pickup apparatus comprises a photoelectric
10 conversion element;
 the electromagnetic wave comprises light; and
 a wavelength conversion layer for converting a radiation into the light within a wavelength region which can be converted by the photoelectric
15 conversion element is formed on the photoelectric conversion element.

 15. A radiation image pickup apparatus comprising the image pickup apparatus according to
20 any one of claims 1 to 13, wherein:

 the semiconductor conversion element of the image pickup apparatus comprises an element for directly converting a radiation into an electrical signal; and
25 the electromagnetic wave comprises the radiation.

16. A radiation image pickup system comprising:
the radiation image pickup apparatus according
to claim 14 or 15;

5 a signal processing unit for processing a
signal from the radiation image pickup apparatus;
a recording unit for recording a signal from
the signal processing unit;

a display unit for displaying the signal from
the signal processing unit;

10 a transmission unit for transmitting the signal
from the signal processing unit; and
a radiation source for generating the radiation.